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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/920,755 | 08/03/2001 | Tomoko Koyama | 110321 | 5964 |

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| EXAMINER |
|---|
| PHINNEY, JASON R |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2879 | |

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Application No. | Applicant(s) |
|---|---|
| 09/920,755 | KOYAMA ET AL. |
| **Examiner** | **Art Unit** |
| Jason Phinney | 2879 |

# Office Action Summary

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *18 March 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5 and 12-17* is/are rejected.

7)☒ Claim(s) *3,6-11 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5 and 6* .
4) ☐ Interview Summary (PTO-413) Paper No(s) _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 2, and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 2, and 4 each recite the limitation "wherein light generated in the light-emitting layer is emitted by inhibiting spontaneous emission in two dimensions." This recitation is indefinite because it seems to imply that inhibiting emission is the mechanism for causing emission. For purposes of examination the Examiner has interpreted this limitation to mean that the light is only emitted in one direction.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language

4. Claims 1, 5, and 15-17 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,780,174 to Tokito.

Regarding Claim 1, Tokito discloses a light-emitting device comprising a light-emitting layer which emits light by electroluminescence (Figure 4, #16), a pair of electrode layers (Column 6, Lines 15-20) for applying an electric field to the light-emitting layer, and an optical element (#'s 12 and 22) for causing light generated in the light-emitting layer to be transmitted in a predetermined direction, wherein the optical element forms an incomplete photonic band which inhibits spontaneous emission of light in one dimension or two dimensions; and wherein light generated in the light-emitting layer is emitted only in one dimension (See Figure 15).

Regarding Claim 5, Tokito further discloses that the optical element should be formed so that the energy level of emission spectrum of the light-emitting layer includes the energy level at a band edge in a band formed by the optical element (see Figure 6).

Regarding Claim 15, Tokito further discloses that the light-emitting layer should include an organic light-emitting material (Column 6, Lines 14-20)

Regarding Claim 16, Tokito further discloses that the light-emitting device should further comprise at least one of a hole transport layer and an electron transport layer (Column 6, Lines 14-20).

Regarding Claim 17, Tokito further discloses that the hole transport layer or the electron transport layer is one type of medium layer in the optical element (See Figure 4, #'s 18 and 20).

5 Claims 2 and 12-14 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U.S. Patent No. 6,487,231 to Boucart

Regarding Claim 2, Boucart discloses a light-emitting device that comprises a substrate (Figure 3, # 24) and a light-emitting section, wherein the light-emitting section includes: a light-emitting layer (# 30) which emits light by electroluminescence; a pair of electrode layers for applying an electric field to the light-emitting layer (Column 8, Lines 10-18); an optical element for causing light generated in the light-emitting layer to be transmitted in a predetermined direction (#'s 12 and 14); and an insulating layer (#'s 32 and 34) which is disposed between the pair of electrode layers, partially has an opening through which current is supplied to the light-emitting layer, and functions as a current blocking layer which determines a region in which current flows (Column 6, Lines 63-65), wherein the optical element forms an incomplete photonic band which inhibits spontaneous emission of light in one dimension or two dimensions; wherein light generated in the light-emitting layer is emitted only in one dimension (Column 5, Lines 56-57).

Regarding Claim 12, Boucart further discloses that the opening in the insulating layer should face the optical element; and the opening is a slit extending in a periodic direction of the optical element (see Figure 3, #'s 32 and 34)

Regarding Claim 13, Boucart further discloses that part of the light-emitting layer should form part of the medium layers in the optical element (see Figure 3, #30).

Regarding Claim 14, Boucart further discloses that at least the light-emitting section should be covered with a protective layer (see Figure 3, space on either side of 30).

***Allowable Subject Matter***

6. Claims 3, 6-11, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding Claim 3, the prior art of record and relied upon fails to show or suggest a light-emitting device as defined in claim 2, further comprising a waveguide section integrally formed with the light-emitting section, wherein the waveguide section includes: a core layer which is integrally continuous with at least part of the optical element; and a cladding layer which is optically continuous with the insulating layer. A light-emitting device according to the instant invention would provide an easily directed light emission.

Claim 18 depends on and further limits Claim 3 and contains allowable subject matter for at least the reasons indicated above.

Regarding Claim 6, the prior art of record and relied upon fails to show or suggest a light-emitting device as defined in claim 1, wherein the optical element forms in an XY surface an incomplete photonic band of one dimension having a refractive index distribution which is periodic in one direction; and wherein the light emitting device further comprises another optical element which inhibits spontaneous emission of light in two dimensions in combination with the incomplete photonic band of the above optical element. A light-emitting device according to the instant invention would better define the direction of the emitted light.

Regarding Claim 7, the prior art of record and relied upon fails to show or suggest a light-emitting device as defined in claim 1, wherein the optical element forms in an XY surface an incomplete photonic band having a refractive index distribution which is periodic in the X-direction and the Y-direction; and wherein the incomplete photonic band includes columnar-shaped first medium layers arranged in a shape of a tetragonal lattice and a second medium layer formed between the first medium layers. A light-emitting device according to the instant invention would better define the direction of the emitted light.

Regarding Claim 8, the prior art of record and relied upon fails to show or suggest a light-emitting device as defined in claim 1, wherein the optical element forms in an XY surface an incomplete photonic band having a refractive index distribution which is periodic in first, second and third directions, and wherein the incomplete photonic band includes columnar-shaped first medium layers and a second medium layer formed between the first medium layers. A light-emitting device according to the instant invention would better define the direction of the emitted light.

Claims 9 and 10 depend from and further limit Claim 8 and as such contain allowable subject matter for at least the reasons given above.

Regarding Claim 11, the prior art of record fails to show or suggest that at least part of the light-emitting layer of Claim 2 should be provided within the opening formed in the insulating layer. A light-emitting device according to the instant invention would be better oriented to receive current.

7. Claim 4 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

The prior art of record fails to show or suggest a light-emitting device comprising a substrate, a light-emitting section and a waveguide section which transmits light from the light-emitting section, the light-emitting and waveguide sections being integrally formed on the substrate, wherein the light-emitting section includes: a light-emitting layer which emits light by electroluminescence; a pair of electrode layers for applying an electric field to the light-emitting layer; an optical element for causing light generated in the light-emitting layer to be transmitted in a predetermined direction; and an insulating layer which is disposed between the pair of electrode layers and functions as a cladding layer, wherein the waveguide section includes: a core layer which is integrally continuous with at least part of the optical element; and a cladding layer optically continuous with the insulating layer, wherein the optical element forms an incomplete photonic band which inhibits spontaneous emission of light in one dimension or two dimensions, and wherein light generated in the light-emitting layer is emitted in one dimension. A light-emitting device according to the instant invention would provide an easily directed light emission.

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Phinney whose telephone number is (703) 305-3999. The examiner can normally be reached on M-F 7:30-4:00

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JP
May 12, 2003

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